Synthesis and characterization of carbon-based bifunctional catalyst

Abstract

The current synthesis of carbon-based bifunctional catalyst is energy extensive as it requires high heat treatment whereas the use of amorphous carbon as support is not well understood. This paper reports the study of bifunctional catalyst synthesis using an amorphous carbon with polycyclic aromatic structure as support. Initially, the support precursor pyrolyzed under nitrogen atmosphere, followed by functionalization with fuming sulphuric acid. The functionalized char was deposited with hexachloroplatinic acid as the metal precursor at 0.5% Pt (wt%). The impregnated solution was reduced with formaldehyde to reduce the hexachloroplatinum complex to platinum. FTIR analysis has shown noticeable peaks necessary for –SO3H, -COOH and –OH acidic groups while the structure of the samples was identified as amourphous as the XRD analysis spectrum shows broad band peaks. Platinum deposition was successful as observed from the XRD spectrum & EDX result which is visible through SEM magnification as white bright spots. Total acidity decreased 13.5% after impregnation of platinum suggesting that acidic groups replaced by metal particles. The newly created sugar catalyst with platinum has potential to be a bifunctional catalyst for the synthesis of branched paraffin via isomerization of paraffin as a cleaner fuel additive

alternative compared to MTBE.